

DOE READING ROOM  
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4. Document Date: unknown, but reffers to RDT tests done 1-30-67 through 10-1-69; author: Gene Start	b. If report: Title:  c. If publication: Name: Volume: Issue:											
5. Summary (2-3 lines indicating the major subject(s) of the document): Gene Start authored a document, a portion of which is preserved here. Uranine dye was releaed with molecular or methyl iodine and relative diffusion measured. It is shown that diferent tracers diffuse at different rates, thus diffusion climatology determined by one tracer may not correctly predict concentrations of another effluent. See Relative Diffusion Tests RDT-1,2,3&4, 11-3-67, 5-7-68, and 10-1-69.												
6. Name and telephone number of person completing form:  Burton R. Baldwin (208) 525-0203	7. Organization:  Lockheed Idaho Technologies Co.	8. Date:  March 29, 1995										

☐ Check here if a copy of the document is being sent to Headquarters.

HUMAN RADIATION EXPERIMENTS  
RECORDS PROVENANCE FORM

REPOSITORY NAME	INEL
COLLECTION NAME	IDAHO RELATIVE DIFFUSION TESTS
BOX NUMBER	INEL BOX NO. D-14690 FRC AGENCY BOX NO. 37 FRC NO. 706316 ACCESSION NO. 434 89 0277
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HEI FORM DOCUMENT NO.: T070240  
DOCUMENT NO.: T070328  
DOCUMENT TITLE: DIFFUSION AND DEPOSITION COMPARISONS  
CROSS REFERENCES:  
ITEMS OF INTEREST:

#### 1.4 DIFFUSION AND DEPOSITION COMPARISONS

A set of paired diffusion tests over 30 minute time periods were conducted to directly determine whether significant differences exist in the diffusion and deposition characteristics of uranine dye and molecular iodine gas. Each of these tracers were released simultaneously with methyl iodide gas. Thirty minute mean plume centerline concentrations, crosswind-integrated concentrations, standard deviations of lateral plume spread, and limited amounts of vertical sampling all reflected the effect of different rates of effluent deposition. Lateral plume spreading was least sensitive to the rates of deposition involved. Peak centerline concentrations and crosswind-integrated concentrations were highly sensitive to the different removal rates. For weak temperature lapse conditions during these tests, uranine dye concentration values underestimated molecular iodine gas concentrations by about 2 1/2 times, and methyl iodide gas concentrations by about 4 1/2 times. The general finding of this test set comparison is that real caution must be exercised if the diffusion climatology of one tracer is to be used to describe the concentrations of another effluent.

THIS SECTION  
OF PAGE DESTROYED

OVHD Slide #1	$\sigma_y$ values from CDT vs NRTS climatology	Dye & ME II-CDT2 MOLE & ME IV-CDT4
OVHD Slide #2	Table of $CIC0/2$ values and comparisons	
OVHD Slide #3	$x_p$ 0/Q MOLE & methyl normalized dye vs NRTS climatology	

REPOSITORY INEL  
COLLECTION IDAHO RELATIVE DIFFUSION TEST  
BOX No. D14680, FRC# 434 89 0277  
FOLDER DIFFUSION AND DEPOSITION COMPARISON

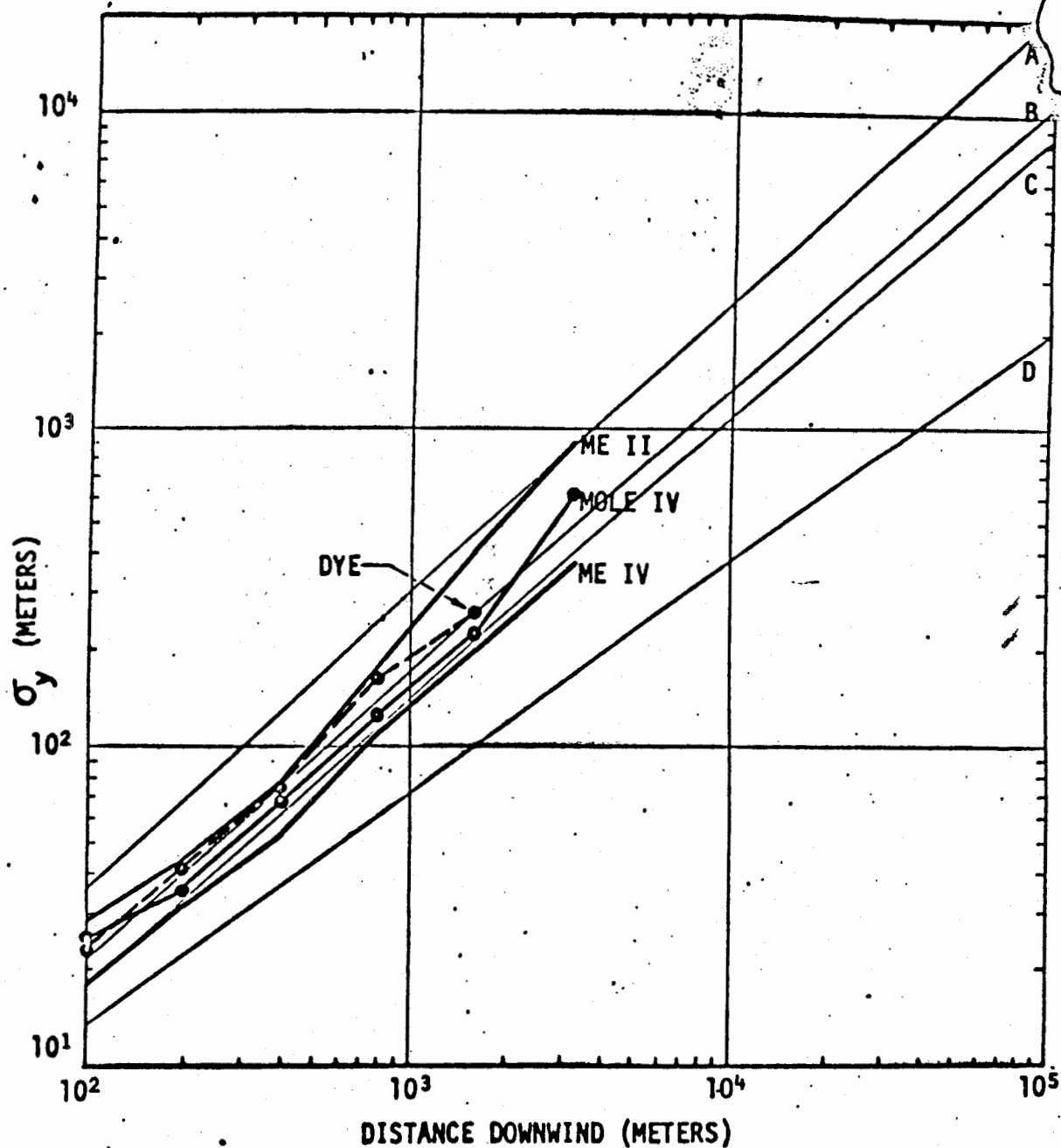


FIGURE 1. LATERAL DIFFUSION VERSUS CLIMATOLOGICAL CURVES

TABLE 2. COMPARISONS OF CROSSWIND INTEGRATED CONCENTRATIONS

DISTANCE (M)	CICU/Q			CICU/Q			RATIO DYE TO MOLE.
	METHYL	DYE	RATIO	METHYL	MOLECULAR	RATIO	
100	116.	33.8	3.4	227.4	215.4	1.1	0.32
200	54.5	11.9	4.6	124.8	70.7	1.8	0.39
400	14.0	3.06	4.6	66.2	44.1	1.5	0.33
800	5.48	1.24	4.4	33.8	16.9	2.0	0.45
1600	2.24	0.49	4.6	9.19	5.03	1.8	0.39

MEAN RATIO = 0.38  
(DYE/MOLE.)

ALL VALUES OF CICU/Q SHOULD BE MULTIPLIED BY  $1. \times 10^{-3}$ .

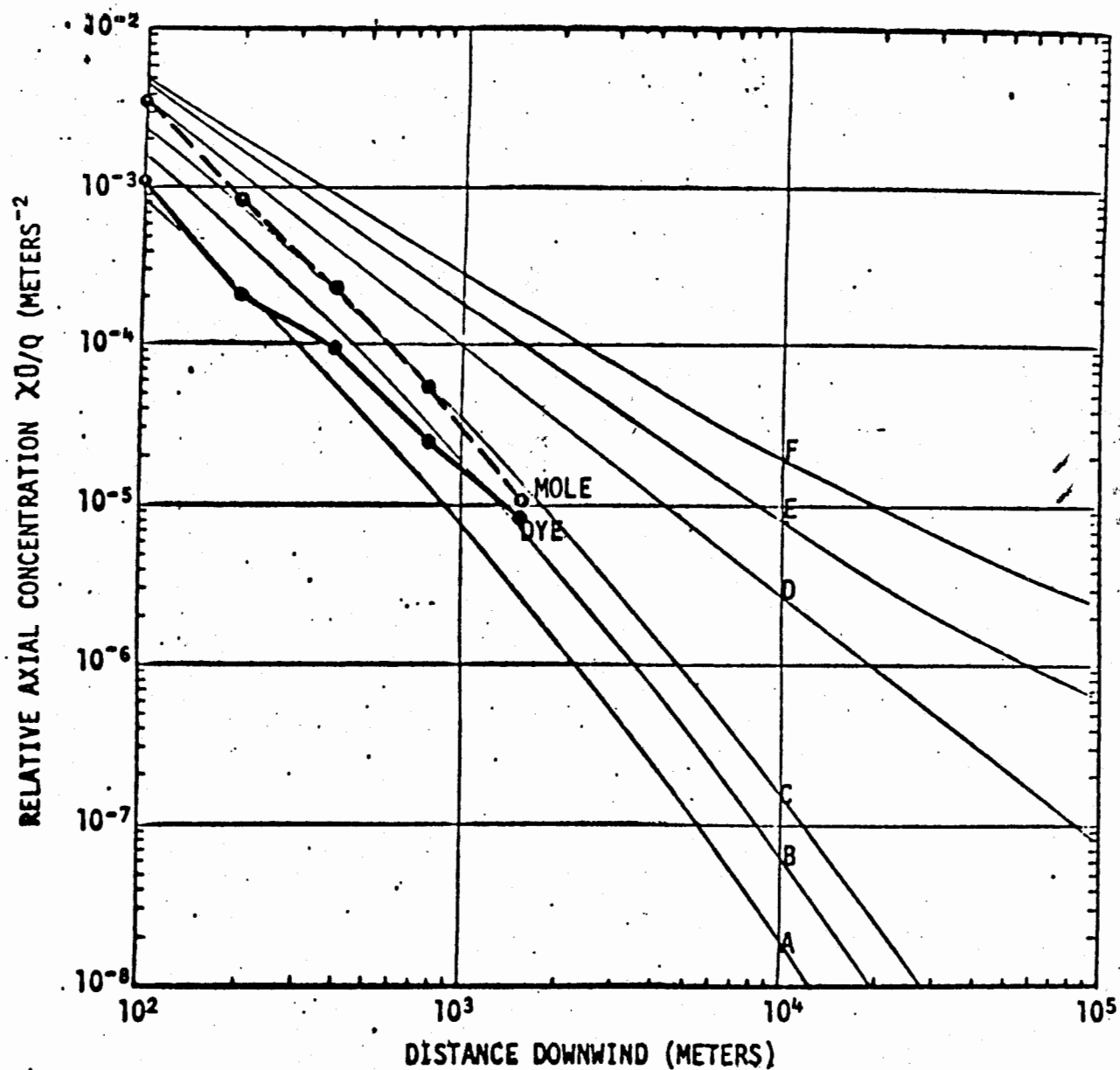


FIGURE 2. RELATIVE AXIAL CONCENTRATION VS, CLIMATOLOGICAL CURVES.